# A STUDY IN ANTENNAL VARIATION.*

By Edith M. Patch.

PLATES XXIV–XXVII.

During the summer and fall of 1912 annulation counts of 1243 antennae of *Schizoneura* developing on *Ulmus* (leaf and bark), and *Pyrus* and *Crataegus* (bark) were made by Mr. William C. Woods and the writer of this paper.

A detailed record of the annular sensoria present on each of joints III, IV, and V of every antenna counted, giving a tabulation of 3729 counts in all, is preserved on file at the Maine Agricultural Experiment Station and a copy of this record will be lent upon request to any one making a particular study of the species concerned. The counts in tabular form are too bulky to be conveniently printed as they stand; and as nearly 100 curves would be necessary to cover the various collections adequately that method of presentation was also rejected for the time though part of the data may be reduced to this form later.

The drawings of the 90 antennae selected show, however, the most significant ranges of variation and give in themselves a summary sufficient for most purposes. The antennae are all drawn to the same scale with particular reference to the number of annulations present on each of the joints III to V and where of interest also of joint VI; and the length of each joint. No especial attention has been paid to other antennal details and the drawings are not to be considered a study of the terminal joint except in the two respects indicated. In some instances the drawings were made from mounts in which the antenna was curved on the slide and an arbitrary correction of this for the purpose of getting approximately straight drawings for plates, gives the peculiar irregularity in contour apparent.

Frequent examples of freak antenna in which two joints were apparently merged were met and some of these are represented by Figs. 32–36 and Fig. 82.

Appreciative thanks are due to several widely scattered entomologists for their kindness in sending material from different localities, who are, in part, acknowledged in the collection data which follow.

*Papers from the Maine Agricultural Experiment Station: Entomology No. 62.

*History of Collections Tabulated.*

39–04. (Fig. 74). Elm rosette. Orono, Me. June 15, 1904.

6–05. (Fig. 90). Mixed collection from elm leaf roll and rosette. Orono. June 16, 1905.

95–06. (Figs. 19–21). Elm bark. Orono, Aug. 4, 1906.

114–06. (Fig. 29). Crataegus bark. Maine. Sept. 17, 1906.

115–06. (Figs. 30–31). Apple bark. Maine. Sept. 17, 1906.

7–08. (Fig. 22). Elm bark. Orono. June 16, 1908.

50–09. (Figs. 14–18). Elm leaf collection. Brewer, Me. July 1, 1909.

63–11. (Figs. 23–26). *Pyrus* sp. bark. (cultivated variety of mountain ash). Orono. Aug. 28, 1911.

64–11. *Pyrus sitchensis* (Roem) Piper, bark. Orono. Aug. 29, 1911.

6–12. (Fig. 13). Elm leaf roll. Alabama. Received May 6, 1912. Progeny of this collection lived for a fortnight on apple seedlings.

9–12. (Fig.11). Elm leaf roll. Columbia, Mo. Received May 12, 1912, from Dr. L. Haseman. The winged progenitors of 9–12. Sub. 1. (Fig. 27) which were reared in the laboratory on apple seedlings. A fuller account of this collection is given in Bulletin 203 of the Maine Agricultural Experiment Station.

9–12. Sub. 1. (Fig. 27). Apple seedling. Laboratory bred. Sept. 20, 1913. The progeny of 9–12 which see for discussion.

11–12. (Fig. 12). Elm leaf roll. Knoxville, Tenn. Received May 20, from Dr. Gordon Bentley. Progeny of this collection were reared on apple seedlings from May 20 to June 26.

12–12. (Fig 10). Elm leaf roll. Marion, S. C. Received May 28, 1912, from Mr. W. A. Thomas.

21–12. (Fig. 89). Mixed collection from elm leaf roll and rosette. St. Louis, Mo. Received June 3, 1912, from Mr. J. T. Monell.

29–12. Elm rosette. Orono. June 6, 1912.

30–12. (Figs. 83–88). Elm leaf roll. Marion, S. C. Received June 8, 1912, from Mr. W. A. Thomas.

35–12. (Figs 8 and 9). Elm leaf roll. St. Louis, Mo. Received from Mr. J. T. Monell, June 14, 1912.

43–12. (Fig. 2). Elm leaf roll. Orono. June 20. For discussion see 113–12.

45–12. (Fig 68). Elm rosette. Calais, Me. June 21, 1912.

49–12. (Figs. 76–82). Elm rosette. Standish, Me. June 24, 1912. The rosette was old and considerably dried and the migrants were smaller than those from fresher and juicier rosettes.

53–12. (Figs. 3 and 4). Elm leaf roll. Orono. June 26, 1912.

57–12. (Fig. 69). Elm rosette. Caribou, Me. June 26, 1912.

58–12. (Fig. 75). Elm rosette. Berlin, N. H. June 28, 1912.

60-12. (Figs. 32–67). Migrants developed in elm leaf roll and rosette. Collected June 28–July 12, 1912, from the ventral surface of leaves of *Pyrus americana* (Mountain Ash), to which they had migrated. A fuller account of this collection is given in Journal of Economic Entomology, Vol. 5, p. 397.

61–12. (Figs. 70–73). Elm rosette. Oakland, Me. June 29, 1912.

65–12. Elm rosette. Orono. June 21, 1912.

68–12. (Fig. 1). Elm leaf roll. Houlton, Me. June, 1912.

111–12. (Fig. 5). Elm leaf roll. Orono. July 20, 1912.

113–12. (Figs. 6 and 7). Elm leaf roll. Orono. July 23, 1912. Purposely collected late for comparison with 43–12 (Fig. 2) which developed June 30 in the same rolls. The difference in the actual size of the antennae and in the number of annulations of the big, thrifty early ones from the juicy leaf and the last individuals to develop in the drying roll would seem suggestive of the physiological effect of the habitat on the size of the individual and the character of the antennae.

165–12. *Pyrus sitchensis* Piper, bark. Orono. Sept. 24, 1912.

175–12. Apple bark. Orono, Me. Sept. 28, 1912.

176–12. (Fig.28). *Crataegus* (*monogyna*) *Oxyocantha*. St. Louis, Mo., September 27, 1911. Mr. J. T. Monell.

Note. By elm leaf "roll" is indicated a deformation of a single leaf. By "rosette" is indicated a terminal cluster. (Figs. 442 and 462, Bulletin 203, Me. Agr. Expt. Sta.).

*List of Figures With Cross Reference to Collections.*

Fig 1, 68–12; Fig 2, 43–12; Figs. 3–4, 53–12; Fig. 5, 111–12; Figs. 6–7, 113–12; Figs. 8–9, 35–12; Fig. 10, 12–12; Fig. 11, 9–12; Fig. 12, 11–12; Fig. 13, 6–12; Figs. 14–18, 50–09; Figs. 19–21, 95–06; Fig. 22, 7–08; Figs. 23–26, 63–11; Fig. 27, 9–12 Sub 1; Fig. 28, 176–12; Fig. 29, 114–06; Figs. 30–31, 115–06; Figs. 32–67, 60–12; Fig. 68, 45–12; Fig. 69, 57–12; Figs. 70–73, 61–12; Fig. 74, 39–04; Fig. 75, 58–12; Figs. 76–82, 49–12; Figs. 83–88, 30–12; Fig. 89, 21–12; Fig. 90, 6–05.

Figs 17 and 18 are right and left antennæ of same individual.

Figs. 37 and 38 are right and left antennæ of same individual.

Figs 64 and 65 are right and left antennæ of same individual.